



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,027	01/26/2004	Kwan Ju Koh	20059/PIA31191	1316
34431	7590	09/19/2005		
HANLEY, FLIGHT & ZIMMERMAN, LLC 20 N. WACKER DRIVE SUITE 4220 CHICAGO, IL 60606			EXAMINER NOVACEK, CHRISTY L	
			ART UNIT 2822	PAPER NUMBER

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/765,027	<b>Applicant(s)</b> KOH, KWAN JU	
	<b>Examiner</b> Christy L. Novacek	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the amendment filed June 30, 2005.

#### ***Response to Amendment***

The amendment of claim 1 is sufficient to overcome the objection to claim 1 stated in the previous office action. Therefore, this objection is withdrawn.

The amendment of claim 1 is sufficient to overcome the rejection of claims 1-7 under 35 U.S.C. 112, second paragraph stated in the previous office action. Therefore, this rejection is withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 6,309,933) in view of Yagashita et al. (US 6,607,952) and Lee et al. (US 5,583,064).

Regarding claim 1, Li discloses forming a first oxide layer (12) on a surface of an active region of a substrate (10) and implanting ions thereinto for forming a low-doped drain (65) in the active region, forming a first nitride layer (22), removing a part of the first nitride layer and the oxide layer where a gate will be located and etching the substrate corresponding to the part by a predetermined depth, forming a second oxide layer (32) over an exposed portion of the substrate, implanting ions (38) into the substrate, removing the second oxide layer, depositing a gate insulating layer (40) and a polysilicon layer (42), polishing until the first nitride layer is exposed, removing the nitride layer, depositing a conformal oxide layer (62) and a second nitride layer

Art Unit: 2822

(64), etching the second nitride layer to form a gate sidewall (70) of nitride, implanting ions (72) into the substrate to form a source and drain (68) at both sides of the gate and removing an exposed oxide layer (col. 3, ln. 50 – col. 5, ln. 67).

Li does not disclose selectively forming a shallow trench isolation in a substrate.

Yagashita discloses forming a shallow trench isolation (12/13) in the substrate of an integrated circuit in order to electrically isolate the active regions on the substrate so that multiple devices may be formed on the substrate, as is well-known in the art (col. 4, ln. 59-62). At the time of the invention, it would have been obvious to one of ordinary skill in the art to form shallow trench isolation regions in the substrate of Li, as shown by Yagashita, because it is conventional in the art to form these regions for the purpose of electrically isolating active regions on an integrated circuit substrate.

Li discloses implanting the ions for forming the low-doped drain in the active region after the formation of the gate. Like Li, Lee discloses forming a MOSFET in a depression of a semiconductor substrate. Lee discloses that the ions for forming the low-doped drain and source can be implanted into the active region can be implanted either before or after the gate has been formed (col. 5, ln. 5-34; col. 6, ln. 60-65). At the time of the invention, it would have been obvious to one of ordinary skill in the art to implant the ions that form the low-doped drain and source of Li either before or after the formation of the gate because Lee teaches that either method results in a functional MOSFET product having low-doped source and drain positioned adjacent to each side of the gate and because when a prior art reference teaches a method which is the same as the method being claimed in an application under examination except for a difference in the order in which the steps of the method are conducted, the claimed method of the

Art Unit: 2822

application is not patentable over the prior art method if no unexpected result occurs by the change in the order of the steps. See *Ex parte Rubin*, 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.).

Regarding claim 2, Li discloses that the substrate is a silicon substrate (col. 3, ln. 23-25).

Regarding claim 3, Yagashita discloses that the shallow trench isolation includes oxide layers (col. 4, ln. 59-62).

Regarding claim 4, Li discloses that the predetermined depth is about 800-1200 Angstroms (col. 4, ln. 9-13).

Regarding claim 6, Li discloses that the step of polishing until the nitride layer is exposed, includes a chemical mechanical polishing (CMP) step (col. 4, ln. 45-48).

Regarding claim 7, Li discloses that the second nitride layer is removed by an etch back process (col. 5, ln. 53-55).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. and Yagashita et al. and Lee et al. as applied to claim 1 above, and further in view of Bovaird (US 4,830,975).

Art Unit: 2822

Regarding claim 5, Li discloses growing the second oxide layer to have a thickness of about 100-150 Angstroms, but Li does not disclose the particular temperature range used to grow the oxide (col. 4, ln. 14-18). Like Li, Bovaird discloses oxidizing a silicon substrate to grow a thin layer of oxide thereon. Bovaird states that this thin oxide layer can be formed by a wet oxidation method at a temperature of 750°C (col. 2, ln. 64-65). At the time of the invention, it would have been obvious to one of ordinary skill in the art to grow the second oxide layer of Li by the oxidation process taught by Bovaird because Li does not disclose any particular temperature to be used and Bovaird teaches that a wet oxidation done at 750°C can successfully oxidize a thin layer of a silicon substrate.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2822

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN  
September 13, 2005

  
AMIR ZARABIAN  
SUPERVISOR  
TEL.